

ABSTRACT

PREDICTION OF HYDROLOGICAL DROUGHT: WHAT CAN WE LEARN FROM CONTINENTAL-SCALE OFFLINE SIMULATIONS?

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Land surface model experiments are used to quantify, across the coterminous United States, the contributions (isolated and combined) of soil moisture and snowpack initialization to the skill of seasonal streamflow forecasts at multiple leads and for different start dates. Forecasted streamflows are compared to naturalized streamflow observations where available and to synthetic (model-generated) streamflow data elsewhere. We find that snow initialization has a major impact on skill in the mountainous western U.S. and in a portion of the northern Great Plains; a mid-winter (January 1) initialization of snow in these areas leads to significant skill in the spring melting season. Soil moisture initialization also contributes to skill, and although the maximum contributions are not as large as those seen for snow initialization, the soil moisture contributions extend across a much broader geographical area. Soil moisture initialization can contribute to skill at long leads (up to 5 or 6 months), particularly for forecasts issued during winter.